

The Indian Rose Annual XVIII - 2002

New Bloodlines for Breeding in the New Millenium with an Emphasis on Warm Climate Rose Breeding

M.S.Viraraghavan

While breeding roses it is of vital importance to bring in fresh genetic input, if substantial results are to be achieved. The case for such an approach has been summarized with admirable brevity by the great rose breeder, Wilhelm Kordes of Germany: "The soup ladle will bring out only what has been put into the tureen".

A most important corollary is the need to evolve a separate line of breeding for warm climates, which is the point emphasized many years ago (1930's) by India's premier hybridizer, B.S.Bhattacharji. Creation of such a line carries with it the daunting (?) implication that we have to consciously reverse the very basis of Western rose breeding with its emphasis on winter hardiness. Warm climate rose breeding has received comparatively little attention in the past – in fact, the great pioneer is Australia's Alister Clark.

At this stage it is appropriate to consider our objective. TO MY MIND THE MAIN FOCUS HAS TO BE ON THE BEAUTY OF THE ROSE AS A PLANT AND NOT JUST AS A FLOWER. Eminent authorities like Sam McGredy and, several decades earlier, the English rosarian, Thomas Rivers, have stressed the need for roses to be beautiful even when not in flower.

With these objectives, I have begun work with two Indian rose species, *Rosa clinophylla* and *Rosa gigantea* for almost 30 years. *R. clinophylla* which has lovely evergreen foliage and white single flowers is perhaps the only really tropical species in the entire world. Like most species it is once flowering. One form grows with its feet in water on the islands in the river Ganges, another in the incredible dry

heat of the Bihar plains, and a third form on a mountain in the Rajasthan desert, Mt. Abu.

Initial crosses with both diploid and tetraploid garden roses have now progressed to where we have healthy repeat flowering seedlings, which hopefully, will be the basis for better garden roses. Three such seedlings have been registered with the International Rose Registration Authority – ‘Ganges Mist’, ‘Silver Dawn’ and ‘Ganges Nymph’.

The genetic gap between *R. clinophylla* and modern roses has been bridged, but whether the genes for heat resistance have been carried forward remains to be seen. However, reports on these roses from areas which are warm, even hot, show promise.

Breeding has also been done following Alister Clark’s lead with *R. gigantea*, using a clone collected in North East India, at Ukhrul in Manipur State. *R. gigantea* possesses tremendous vigour and lovely disease-resistant foliage, justifying Graham Stuart Thomas’s observation that it is the ‘empress of wild roses’.

Starting with the second generation, repeat flowering has appeared and now, in the later generations, there are roses which resemble vigorous modern Hybrid Teas.

What of the future? It is clearly necessary to integrate the two breeding lines, as *R. gigantea*, which is the ancestor of modern roses, will, hopefully, act as a bridge between *R. clinophylla* and modern roses. This integration has taken place and resulted in a seedling which is being used in further breeding. We have to simultaneously bring in other evergreen rose species such as *R. laevigata* and *R. bracteata* in order to further improve rose foliage quality and better petal texture so vital in a warm climate. We should do more work with evergreen species, as the link between warm climate and evergreen species is close indeed – all the evergreen species are natives of the warm parts of the world. Such work is a crucial part of our overall strategy. A really warm climate requires that we hybridise more roses of the Tea / Nosietta strains, that is, at the diploid level. We love the beauty and grace of the old Tea roses, but it is good to remember that increasing the chromosome

number will lead to a loss of these characteristics.

These new roses require, apart from better petal texture, an intensified color range, best achieved by bringing in the blood of the diploid yellow roses of China and Afghanistan.

Originality is the name of the game!!

Lest the breeding strategy so far outlined be considered mere speculation, it is necessary to highlight certain observations on which it is based.

CHART I shows the new bloodlines recommended and the characteristics we are looking for as well as the rose species which, it is felt, will provide them.

Taking up **HEAT RESISTANCE**, as already mentioned, the 3 forms of *R. clinophylla* cover the entire gamut of heat resistance from moist heat to dry heat as also dry cold. As far back as 1976 in a path-breaking paper presented to the Royal National Rose Society, (RNRS) U.K. sponsored International Rose Conference, Dr. E. F. Allen, then Scientific Advisor to RNRS, suggested the use of *R. clinophylla* for breeding roses for warm climates of the world, including Queensland. (1)

Coming to **EVERGREEN FOLIAGE** and **DISEASE RESISTANCE**, the **CHART** refers to the use of *R. bracteata* and *R. laevigata*. These two species have also lovely flower petal texture which is an eminently desirable quality in warm areas. *R. bracteata* has great disease resistance. Earlier research at Maryland University, USA, indicated it was essentially immune to all forms of Black Spot disease.(2). But this is now disputed. Under Kodaikanal conditions, it never develops Black Spot or mildew. It is also continuous blooming. More recent research by Dr. A.V. Roberts et al (3) suggests that there are two types of Black Spot resistance – genetic and cuticular – i.e. based on the condition of the leaf surface. Is that of *R. bracteata* of the second kind? Latest research (4) shows the existence of 5 different kinds of Black Spot and that *R. davidii elongata* is the one species completely resistant to all these strains. The modern shrub rose, 'Baby Love' the use of which is recommended for further breeding, is derived from *R. davidii elongata*.

On the subject of **PETAL TEXTURE** we should emphasize that one of the chief disadvantages of warm climate adapted roses like the Tea roses, are their extremely thin petal texture. On the Indian plains, a bloom of the variety 'Lady Hillingdon' enchanting at open stage will be bleached out by 10 a.m. in the morning.

No studies seem to have been done on roses to measure their petal thickness, on the lines of the work done with rhododendrons (5). Anyone who has grown *R. laevigata* or *R. bracteata* will testify to their excellent petal texture.

Regarding **VIGOUR** and the need of a bridge to modern roses, there is little doubt that *R. gigantea* is easily the most vigorous of rose species.

If you attempt to hybridise with *R. clinophylla*, the difficulty of bridging the genetic distance between it and modern roses is painfully obvious. So it is logical to bring in *R. gigantea*, and the recently discovered original Chinese rose, *R. chinensis spontanea*, which is in the background of our modern roses, to simplify the process. To this end, my seedlings of *R. gigantea* x *R. clinophylla*, mentioned earlier will, hopefully, make further progress much easier.

Dr. Robert Basye, who has endowed a Chair in Rose Breeding at the Texas A & M University, USA suggested the creation of artificial tetraploids by crossing diploid rose species and doubling their chromosome number with the drug colchicines, so that their chromosome number is raised to that of modern roses, thereby facilitating intercrossing. But this too complicated for amateur rose breeders.

Coming to **COLOUR RANGE**, the great disadvantage with heritage warm climate roses is the absence of yellow pigment. The extraordinary colour range of the modern rose is due to the introduction of the gene for dark yellow colour via *R. foetida* by Pernet Ducher, that great rose breeder of France. Bertram Park, a great rose grower and royal photographer – an unique combination of talents – speculated on how the world of roses would have been entirely different if, instead of the Black Spot addicted *R. foetida*, one of the yellow roses of China had been in bloom and caught Pernet Ducher's eye in the Lyon Park. (6).

Work with these yellow roses of China, which are all diploid and therefore easy to cross with our evergreen species which are also diploid, has been shown to be quite feasible, by the Chinese work done by what is called the Rejuvenation Rose Group. An account of this by Trevor Nottle appears in the Spring 1993 Journal of the Heritage Roses, Australia (7).

Fairly recent work by Prof. C.H. Eugster of Switzerland has shown that carotenoids are widespread in rose species and not confined to *R. foetida* alone as earlier surmised, and that even Tea roses have them but at an earlier stage of formation where the colour intensity is still not patent. Of all the old Tea/Noisette roses it is only 'Fortune's Double Yellow' which has the unique capacity to take the carotenoid synthesis further to provide brighter yellow colours. Hence the suggestion to use this variety in my breeding programme.

CHARTS II and III highlight the need to have differing breeding programmes for the extremely warm and the moderately warm climates of the world. The distribution of rose species itself indicates the close link between the chromosome number and the adaptation to climate. While the diploid (2 sets of chromosomes) species are found nearer the Equator, the tetraploid ones (4 sets) exist in more temperate climes, and the octoploid ones (8 sets) in the extreme north near the North Pole. From a horticulturist's angle, we can see that when gardening in a cold climate it is only the Teas/Noisettes of the kind of 'Gloire de Dijon' (tetraploid) or 'Lady Hillingdon' (triploid) which are most successful, unlike the majority of the class which are diploid. The pattern is evident.

On the subject of disease resistance, in addition to 'Baby Love' (derived from *R. davidii elongata*) the use of the recent All America Rose Winner variety, 'Knockout' (with *R. moyesii* in its background) as well as the older shrub rose 'Carefree Beauty' (*R. laxa* in its heritage) seem worthwhile. 'Golden Showers' contributes mildew resistance as was noted long ago by the famous American hybridizer, Dr. W.E.Lammerts (10).

Some of the ideas suggested above have been carried out in my rose breeding work for the past 3 decades, and many of the varieties so derived have

been registered with the International Rose Registration Authority.

This is the text of the First Rumsey Memorial lecture given at the 6th Biennial National Rose Conference of the 'Heritage Roses in Australia, Inc' 1-4th November 2001, at Hahndorf, near Adelaide, South Australia.

References:

1. E.F. Allen: Rose Breeding (3) Proceedings of the 1976 International Rose Conference reported in the RNRS Annual, U.K. 1977, pg 125
2. Bertram Park: Collins Guide to Roses IVth Ed.1962. pg 178
3. Dr A.V.Roberts et al: Resistance and susceptibility to Blackspot. The Rose Annual 1981, RNRS, Uk, pg 117-121. Mentioned by M.S.Viraraghavan in his article 'Rose Breeding for the Tropics' , Indian Rose annual. IX, 1991.
4. Dr. A.V.Roberts et al (2000) Resistance of roses to pathotypes of *Diplocarpon rosae*. Annals of Applied Biology 136, pgs 15-20. Mentioned in the Canadian Rose Annual 2000.
5. Pat halligan: Corolla thickness of rhododendrons. Journal of the American Rhododendron Society. Vol .338, No. 3, Summer 1984
6. Bertram park: The World of Roses, George G Harrap & Co. Ltd 1962. Introduction Pg 5 para 4, pg 9, para 2.
7. Trevor Nottle: Reporting in The Journal of the Heritage Roses Australia Inc Vol. 15, No.3, Spring 1993. Also in Rejuvenation Rose Group by Dr. Yan-ma pg 79, The American Rose Annual 1994
8. Dr David Leach: Journal of the American Rhododendron Society Winter 1982
9. C.H. Eugster & E. Märki-Fischer: The Chemistry of Rose pigments pg 663 Angewandte Chemie Vol. 30 No. Marka-Fischer 6. June 1991, International

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10. Dr. W.E.Lammerts: Hybridising Roses with Immunity.

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CHART I

NEW BLOODLINES

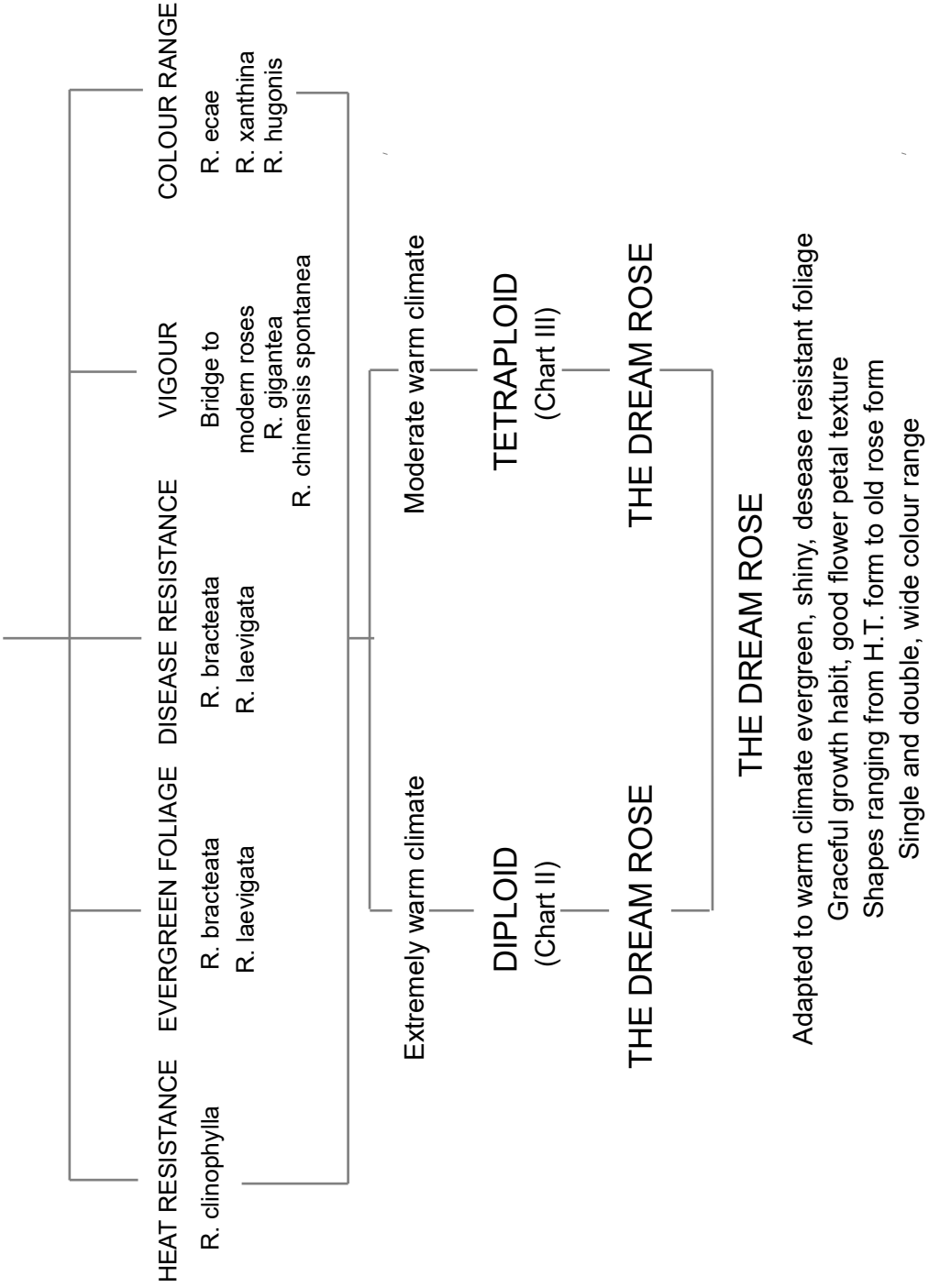


CHART II

THE EVERGREEN ROSE **NEW BLOODLINES**

DIPLOID LEVEL

Suggested bridge crosses

R. clinophylla

R. clinophylla x *R. gigantea*
R. clinophylla x *R. chinensis* spontanea

Further crosses

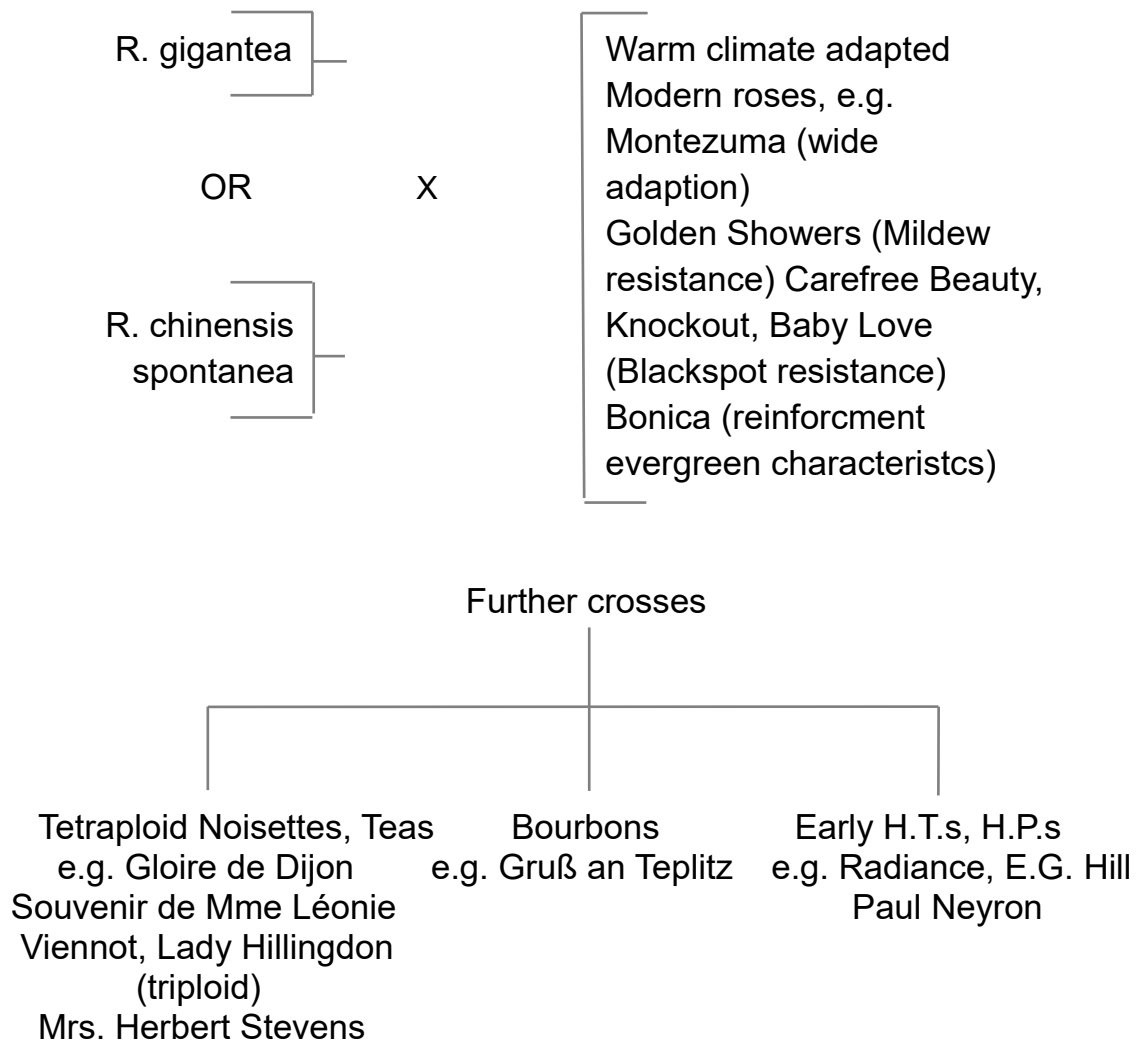
Chinas	Teas	Noisettes	Polyanthas
e.g. Archduke Charles	e.g. Mme Falcot Safrano	e.g. Rêve d'Or Crépuscule	China Doll Cécile Brunner Perle d'Or

CHART III

THE EVERGREEN ROSE NEW BLOODLINES

TETRAPLOID LEVEL

Suggested bridge crosses



Copies of the original

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A most important corollary is the need to evolve a separate line of breeding for warm climates, which is the point emphasized many years ago (1930's) by India's premier hybridiser, B.S. Bhattacharji. Creation of such a line carries with it the daunting(?) implication that we have to consciously reverse the very basis of western rose breeding with its emphasis on winter hardiness. Warm climate rose breeding has received comparatively little attention in the past - in fact, the great pioneer is Australia's Alister Clark.

At this stage it is appropriate to consider our objectives. **TO MY MIND THE MAIN FOCUS HAS TO BE ON THE BEAUTY OF THE ROSE AS A PLANT AND NOT JUST AS A FLOWER.** Eminent authorities like Sam McGredy and, several decades earlier, the English rosarian, Thomas Rivers, have stressed the need for roses to be beautiful even when not in flower.

With these objectives, work has been done with two Indian rose species, *R. clinophylla* and *R. gigantea* for almost 20 years. *R. clinophylla* which has lovely evergreen foliage and white single flowers is perhaps the only really tropical species in the entire world. Like most species it is once flowering. One form grows with its feet in water on the islands in

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the river Ganges, another in the incredible dry heat of the Bihar plains and a third on a mountain in the Rajasthan Desert (Western India).

Initial crosses with both diploid and tetraploid garden roses have now progressed to where we have healthy repeat flowering seedlings, which, hopefully will be the basis for better garden roses. The genetic gap between *R. clinophylla* and modern roses has been bridged, but whether the genes for heat resistance have been carried forward remains to be seen.

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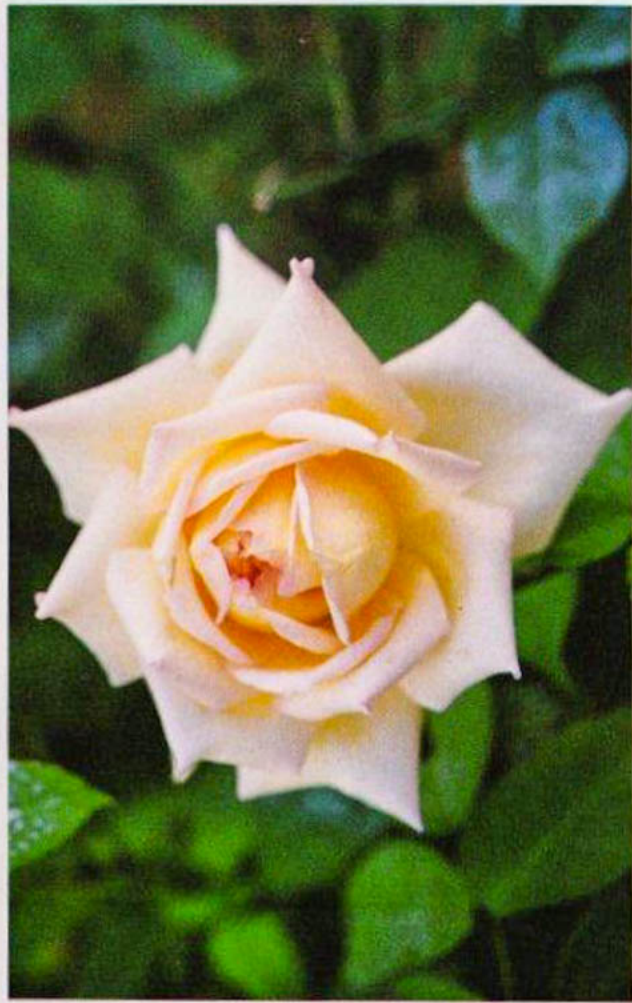
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Two Beautiful Old Roses



Madame Falcot

Photo Courtesy : M.S. Virraghavan



Lady Hillingdon

We require new editions of these lovely heritage roses.

Photo Courtesy : M.S. Viharaghavan

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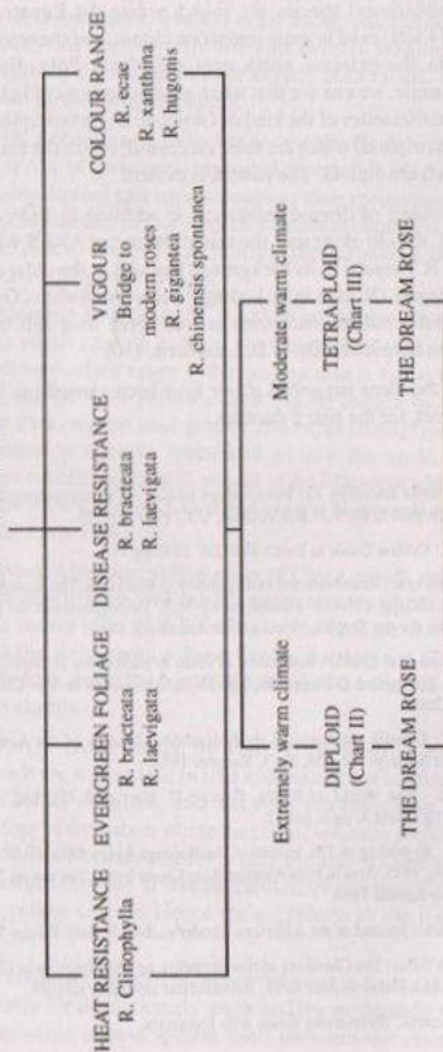
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9. C.H. Eugster & Edith : The Chemistry of rose pigments. pg 663 Angewandte Chemie Vol. 30 No Marka-Fisher 6, June 1991, International edition in English.
10. Dr. W.E. Lammerts : Hybridising Roses with Immunity.

CHART I
NEW BLOODLINES



THE DREAM ROSE

Adapted to warm climate evergreen, shiny, disease resistant foliage
Graceful growth habit, good flower petal texture
Shapes ranging from H.T. form to old rose form
Single and double, wide colour range

CHART II

THE EVERGREEN ROSE

NEW BLOODLINES

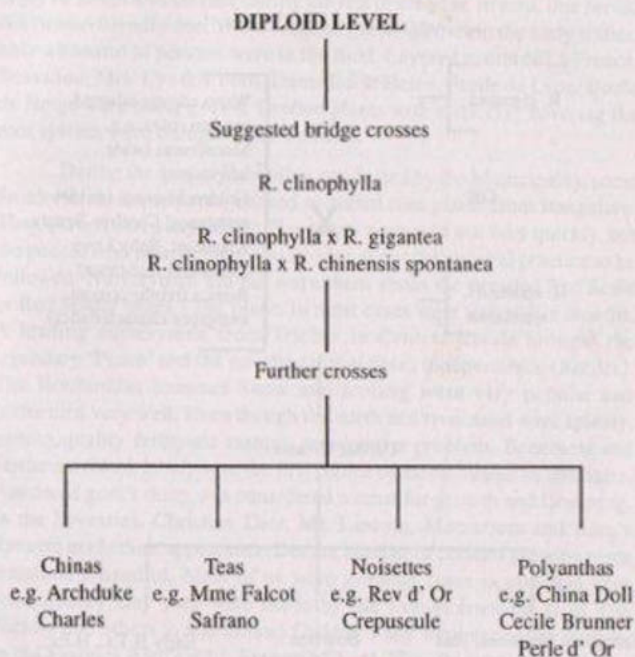


CHART III

THE EVERGREEN ROSE NEW BLOODLINES

TETRAPLOID LEVEL

Suggested Bridge Crosses

R. gigantea

OR

R. chinensis
spontanea

X

Warm climate adapted
modern roses, e.g.
Montezuma (wide
adaptation)
Golden Showers (mildew
resistance) Carefree Beauty,
Knockout, Baby Love
(blackspot resistance)
Bonica (reinforcement
evergreen characteristics)

Further Crosses

Tetraploid Noisettes, Teas
e.g. Glorie de Dijon
Souvenir de Mme Leonie
Viennot, Lady Hillingdon
(triploid)
Mrs. Herbert Stevens

Bourbon
e.g. Gruss An Teplitz

Early H.T.s., H.P.s.
e.g. Radiance, E.G. Hill,
Paul Neyron,
Frau Karl Druschki